American Water Works Association
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Drinking Water Protection Division
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RE: Comments on Draft Underground Injection Control (UIC) Class VI Program Guidance on Transitioning Class II Wells to Class VI Wells

Dear Sir or Madam,

The American Water Works Association (AWWA) is an international, nonprofit, scientific and educational society dedicated to providing total water solutions assuring the effective management of water. Founded in 1881, the Association is the largest organization of water supply professionals in the world. Our membership includes more than 4,000 utilities that supply roughly 80 percent of the nation's drinking water and treat almost half of the nation's wastewater. Our 50,000-plus total membership represents the full spectrum of the water community: public water and wastewater systems, environmental advocates, scientists, academicians, and others who hold a genuine interest in water, our most important resource. AWWA unites the diverse water community to advance public health, safety, the economy, and the environment.

AWWA would like to thank EPA for the opportunity to comment on the document "Draft Underground Injection Control (UIC) Program Guidance on Transitioning Class II Wells to Class VI Wells", made available for comment in December 2013. Our comments below are meant to address specific concerns as well as identify areas for improvement in the final document.

General Comments

There are several general issues in this guidance document that may present significant challenges to EPA, States, operators, and stakeholders should they not be resolved, or at least explored in greater depth.

Need to Regulate CO_2 Sequestration Wells under Class VI Program

First, AWWA agrees that all injection of carbon dioxide for the purposes of storage necessarily increases the risk to USDWs compared to Class II operations and should be

permitted under Class VI, or re-permitted from Class II to Class VI as appropriate. Class VI was specifically designed to address the increased risk to USDWs from higher pressures and other factors unique to sequestering CO_2. To allow for an existing well, after it has transitioned from ER to sequestration activities, to indefinitely function under a less stringent and less specific set of regulations is not appropriate. The Class VI Program also provides a framework to monitor and care for the site after sequestration activities have ended, and to be responsible for remediation in case of problems, whereas the Class II Program does not have these provisions. It is imperative in cases of grey areas that decisions be made to carefully protect USDWs. Therefore, although ER operations occur through Class II, **all CO_2 sequestration activities should be permitted or re-permitted under Class VI as they inherently represent potential increased risk and require long-term care and monitoring. In the case of a dispute (see the next comment), the Class VI director should be better equipped to determine whether a well has been transitioned to sequestration activities and should make the final decision to require transition to a Class VI permit.**

Relationship between Class II and Class VI Program Directors

Second, it is not clear how a dispute between the Class II program director and the Class VI program director would be resolved. Throughout the document there is a discussion of evaluating whether or not there is additional risk to USDWs associated with carbon sequestration activities, and therefore whether an operator would have to switch from a Class II to a Class VI permit. The document goes on the presumption that the Class II and Class VI program directors will work closely together, free from conflict and with clear lines of communication. However, because of the many differences between Class II and Class VI, as described throughout the draft document, it is very likely that at least in early years, many of the states with Class II primacy will not immediately obtain Class VI primacy, and will instead defer to EPA regions to administer their programs. Therefore, it will likely be common that the Class II program directors and the Class VI program directors will not only be part of different agencies (which could also happen when the state has primacy over both programs), but will also probably not be in the same locations or have the same mandates and interests. Therefore, it appears likely that in the instances where it is not entirely clear which program director will ultimately make the decision that conflict will ensue.

Any such conflict would be bad for all parties, including not only operators but also other users (and potential users) of potentially impacted USDWs. For a drinking water utility (primarily a stakeholder in this process), in such a situation it would be unclear where they should turn to if they have questions or concerns over a project that began as Class II and may or may not transition to Class VI.

Therefore, although we recognize that there are many factors that should be considered when there is a potential transition from a Class II to a Class VI permit, we believe that EPA should lay out more specific guidance demonstrating each of the following:

1. **Clear examples** of when a transition would be expected, when it would not be expected, and when it might or might not be appropriate.

2. **Clear delineation of authorities and responsibilities** of the Class II and Class VI program directors. For example, if a Class VI program director believes a Class II program director has not accounted for potential increased risk to a USDW, what specifically that director can require of the Class II director, and what can that director not require. For example, on Page 6 there is a statement that says "40 CFR 144.17 provides that either the Class II or the Class VI UIC Program Director with the authority to require that a Class II owner or operator [provide information]". As currently written, it would appear that a Class VI UIC program director could request this information from a Class II operator even over the objection of a Class II program director, although the referenced regulation is not clear of the subject one way or the other.

3. **A clear path towards resolving conflicts** between the different program directors, the operator, and stakeholders as appropriate.

4. **If any of these cannot be included, a clear explanation of why not**, and as much information as possible to inform readers of alternative resources to answer these questions.

Owner's or Operator's Plan for Recovery of CO_2 at Cessation of Injection for ER

The discussion of owner/operator plans for recovery of CO_2 at cessation of injection for ER is confusing and it is unclear how the Class VI Program Director would consider this information, if available (EPA points out that Class II regulations do not require such a plan), in determining whether a Class VI permit is required. For example, it is unclear how such operations would be conducted during the post-injection site care (PISC) period, as the injection well must be plugged, unless a separate extraction well is constructed and operated. It is difficult to envision how such well construction and extraction operations could be conducted during the PISC period without affecting the containment of injected CO_2 and potentially endangering USDWs. EPA should develop more specific guidance on these recovery activities. Given the potential complexities involved, EPA may wish to consider creating an additional guidance document specifically to address CO_2 extraction issues.

Projects Operating Under Injection Depth Waivers

In several places, the Draft Testing and Monitoring Guidance makes reference to the *Draft UIC Program Class VI Well Injection Depth Waiver Application Guidance,* which apparently is still under development, about monitoring and testing for projects that would be operated under the injection depth waiver. EPA should proceed with caution in granting injection depth waivers that allow Class II wells to transition to Class VI wells to ensure that USDWs will be protected from endangerment and that USDWs will not be impaired by these geological sequestration projects.

As we have noted on comments to several previous guidance documents, AWWA continues to be concerned that the injection depth waiver process allowed by the Class VI rule has many limitations that could result in degradation of USDWs. Many of the requirements

are based on good intentions and not on data, and the drinking water community and the citizens they serve are being asked to trust that geologic sequestration technology will work even though there is very little experience with this technology at a large scale. The possibility for unintended consequences to occur with geologic sequestration is very real and is similar to what was observed with the use of Methyl tert-butyl ether (MTBE). MTBE is the fuel additive that was meant to solve an air pollution problem but its use resulted in unanticipated drinking water pollution problems. Carbon dioxide is an energy production/use byproduct that causes air pollution/climate problem but whose mitigation (using geologic sequestration) could potentially cause drinking water contamination and other (supply) problems. EPA needs to draw on the lessons learned from the MTBE situation, and do everything possible to prevent a similar situation from occurring with geologic sequestration. Even though MTBE is an excellent example, the difference in scale between the possible unintended consequences of sequestration and MTBE are huge. Experience gained from deep injection wastewater wells in Florida should also be documented and considered in the injection depth waiver process.

Additional Detailed Comments

Definitions

Total Dissolved Solids (TDS), page xi: The definition of TDS is inconsistent with the definition of TDS in 40 CFR 146.3. EPA should consider using the applicable definition of TDS in this and other Guidance Documents for Geological Sequestering.

Section 3 Factors for Identifying the Need for a Class VI Permit

Section 3.1 Reservoir Pressure, Injection Rate and Production Rate, page 18-20
The equation for pressure threshold within the injection zone (Equation [1] on page 19) at which fluids are predicted to migrate from the injection zone to the lowermost USDW appears to apply only to displacement of groundwater in the injection zone. EPA should revise this section to address how multi-phases, which include a CO_2 (supercritical or otherwise) phase, could influence migration of fluids to the lowermost USDW.

Section 3.6, Additional Factors Determined by the UIC Program Director, page 28
EPA should consider including the following additional items as examples of additional factors that the Class VI Program Director should consider in determine whether a Class VI permit is required:

- Properties of the confining layer above the injection zone and evidence of breaches of its integrity
- Evidence of degradation of water quality in USDWs

SECTION 4 UIC Requirements for Wells Transitioning from the Class II to Class VI Program

Section 4.2.1 Construction and Logging Requirements and Considerations for Wells Transitioning from Class II to Class VI, page 33-35
The introduction to this section states that "[o]wners or operators seeking to transition from Class II to Class VI do not necessarily have to meet the requirements of for construction

and logging as required at 40 CFR 146.8 and 146.87." EPA should revise this section to clarify that the *in lieu* demonstration applies only to the requirements for casing and cementing of Class VI wells (40 CFR 146.8(b)) and the logging, sampling, and testing during the drilling and construction of the well (40CFR146.87(a)) and that all other requirements apply.

SECTION 5 Transitioning Wells and Aquifer Exemptions

Section 5.1 Aquifer Exemptions and GS Projects

AWWA agrees with the provisions in Sections 5.1 to 5.3 designed to provide safeguards for USDWs when expanding the aerial extent of an aquifer extension for CCS. Because the Class VI rule does not allow for the designation of new aquifer exemptions, it is very important that the process of transitioning Class II to Class VI wells be done carefully as to not allow a "back door" to additional aquifer exemptions for Class VI wells by beginning a well as a Class II ER well but with the primary intent of sequestering CO_2. It is important to remember that as fresh water resources continue to be in ever greater demand, that previously less desirable aquifers (with higher TDS) will be tapped and treated for drinking water supplies, meaning that aquifer exemptions should be very carefully considered and granted only when other options are not feasible. Therefore, we recommend that in the case of requesting an aquifer exemption expansion that EPA should collect records (from the Class II director, Class VI director, or operator as appropriate) to demonstrate that the well was actively used as an ER well, and not just permitted as one, prior to requesting the Class VI permit. Furthermore, the Class VI directors should be instructed to carefully review all materials to make sure that the grandfathering clauses contained in the Class VI rule are not being abused to create what should be Class VI wells through the Class II program.

As Section 5 makes several references to injection depth waivers, we have provided additional input on that subject below for consideration for the upcoming draft injection depth waivers guidance.

ADDITIONAL COMMENTS ON THE FORTHCOMING *DRAFT UIC PROGRAM CLASS VI WELL INJECTION DEPTH WAIVER APPLICATION GUIDANCE*

Although EPA has not issued its *Draft UIC Program Class VI Well Injection Depth Waiver Application Guidance*, AWWA provides the following recommendations that should be mandatory for the siting and operation of GS projects that inject CO_2 above the lowermost USDW:

1. A GS owner/operator can only apply for the waiver for injection into a formation above the lowermost USDW if there is no other option available for sequestering CO_2. The waiver process should not be available if there are other viable formations located below the lowermost USDW. It is not a process for GS owner/operators to use to try and reduce project costs by injecting into a shallower aquifer. In addition, the GS owner/operator will collect baseline water quality data for the potentially impacted

USDWs to allow for any degradation in water quality to be measured from the baseline conditions that exist prior to the injection of carbon dioxide.

2. The carbon dioxide injection well shall be located such that a buffer zone is provided between the injection activities and any active or planned drinking water wells. The buffer zone shall be large enough as to provide for a minimum of ten (10) years of travel time for carbon dioxide, as modeled from the point of injection to the drinking water well. In the event of a leakage and/or USDW contamination event, this will allow for spatial separation that will provide the project owner/operator with enough time to appropriately remediate the contamination without adverse impact to the drinking water system.

3. If injection activities result in the leakage of carbon dioxide into a USDW, the GS project owner/operator shall immediately [within 24 hours] notify operators of drinking water wells using that USDW to discontinue using the well if it no longer produces safe, wholesome, potable water. Notification shall also be provided to the appropriate state and local water and/or public health agencies. The GS project owner/operator shall immediately provide an alternative safe drinking water supply as approved by the appropriate water and/or public health agencies.

4. Injection above the lower-most USDW should only be allowed if the full extent of the carbon dioxide plume does not completely cover the lateral extents of the lower-most USDW. The GS project, and resulting carbon dioxide plume, should be sited in such a way that provides for a minimum of four (4) separate points of access (via new drinking water wells) to the USDW without drilling through the plume of sequestered CO_2. These four points should be equally spaced around the project footprint to allow drinking water utilities unrestricted access to those USDWs without worry of leakage of CO_2during well construction.

Thank you for the opportunity to comment on this important draft guidance document. If you have any questions regarding this correspondence or if AWWA can be of assistance in some other way, please contact me or Adam Carpenter at (202) 326-6126 or acarpenter@awwa.org.

Best regards,

Tom Curtis

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